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AUTHOR Kotsonis, Miriam E.; Patterson, Charlotte J.
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ABSTRACT

A study of metacommunicative knowledge was conducted among 10-year-old and 7- to 8-year-old normal and learning disabled (LD) children to ascertain differences in the extent of their knowledge of (1) signs of communication stress and failure and (2) techniques that facilitate effective communication. The specific communication variables investigated were cue sensitivity and strategy use. Subjects were 45 boys (24 LD and 21 normal children from public elementary schools) who were interviewed individually by an adult female who asked each subject a series of open-ended questions about how he would teach a friend to play a game that his friend did not know how to play. Audiotape records of each interview were transcribed verbatim for coding, and responses were scored on a scale of 0 to 3 by two independent coders. Results showed that for both cue sensitivity and strategy use, knowledge increased with age. LD children did not differ from normals on knowledge about cue sensitivity, but they displayed less knowledge than normals on knowledge about strategies for effective communication. Results suggest that limitations in metacommunicative knowledge may contribute to the communicative deficiencies of LD and younger normal children. (Author/MP)

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Teaching a Game to a Friend: Normal and Learning Disabled Children's Knowledge About Communication

Miriam E. Kotsonis

and

Charlotte J. Patterson

University of Virginia

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ABSTRACT

This paper reports a study of metacommunicative knowledge among normal and learning disabled (LD) children. Older (10 year old) and younger (7-8 year old) normal and LD children were interviewed regarding their understanding of two communication-relevant variables. The variables studied were cue sensitivity (knowledge about signs of communication success and failure) and strategy use (knowledge about techniques that facilitate effective communication). Results showed that both for cue sensitivity and for strategy use, knowledge increased with age. LD children did not differ from normals on knowledge about cue-sensitivity, but they evidenced less knowledge than normals about strategies for effective communication. These results suggest that limitations in metacommunicative knowledge may contribute to the communicative deficiencies of LD and younger normal children.

Teaching a Game to a Friend:

Normal and Learning Disabled Children's

Knowledge About Communication

In this paper, we report a study of metacommunicative knowledge among normal and learning disabled children. Metacommunication has been defined as knowledge and cognition about communicative phenomena (Flavell, 1977, Note 1, Note 2), and it thus includes knowledge about communicative tasks, processes, and about one's own and others' abilities as speakers and listeners (Robinson & Robinson, 1976, 1977; Rysberg, 1977).

Two important aspects of metacommunicative knowledge may be labelled "cue sensitivity" and "strategy use". Cue sensitivity involves knowledge about the internal and external cues to which one must be sensitive in order to detect, avoid, or correct comprehension difficulties.[1] Research evidence has shown that children's performances of tasks involving cue sensitivity improve significantly during middle childhood. In the listener role, older children demonstrate more effective monitoring of internal cues regarding their own comprehension (Markman, 1980), and in the speaker role, they show analogous increases in their responsiveness to the external cues, or feedback, given by a listener who indicates noncomprehension (Peterson, Danner & Flavell, 1972; Patterson & Kister, 1980). There is little information, however, regarding the development of knowledge about cue-sensitivity phenomena during the elementary school years.

A second important aspect of metacommunication is knowledge about communicative strategies. A large body of research now exists to document the tremendous increase in strategic communication skills during middle childhood (Flavell, Botkin, Fry, Wright & Jarvis, 1968; Glucksberg, Krauss & Higgins, 1975; Patterson & Kister, 1980). Although younger children are less knowledgeable than older children about the role of the message in communication (Robinson & Robinson, 1977), little else is known regarding the development of knowledge about the use of communicative strategies

during these years. Thus, one major aim of the present study was to describe development during middle childhood of the cue-sensitivity and strategy-use aspects of metacommunication.

If, as we assume, knowledge of this kind is valuable in directing efforts to communicate, then one might expect children who are particularly deficient in their communicative performances also to show metacommunication deficits. Learning disabled (LD) children appear to represent an appropriate group with whom to test such a prediction. Learning disability has been defined as a disorder in "understanding or using spoken or written language" (Federal Register, 1976), and a number of deficiencies in oral communication skills among LD children have been reported (Bryan, 1978; Bryan, Wheeler, Felcan & Henek, 1976 ; Pearl, Donahue & Bryan, Note 3). In fact, Torgesen (1977) has suggested that such deficiencies may stem from metacognitive problems and has stressed the need for "further study of the role of certain 'meta' variables in the performance of learning disabled children" (page 39).

In line with these expectations, Kotsonis and Patterson (1980) found LD children to be less successful in monitoring their own levels of comprehension than normal children who were matched on age and IQ. This suggests that the LD children were less sensitive to internal cues regarding the adequacy of incoming communication.

We do not yet have information, however, about LD children's knowledge and use of external cues--i.e., from a listener--and strategies to assess and facilitate another person's comprehension. These important interpersonal skills could easily contribute to social acceptance of a child, as well as to impressions of his or her competence in communication. Hence, a second major aim of the present research on metacommunicative knowledge was to describe its development among LD children.

In summary, the present study was designed to describe development of metacommunicative knowledge among normal and LD children. To this end, we interviewed both older (10 year old) and younger (7-8 year old) normal and LD children concerning their knowledge about cue-sensitivity and strategy-use aspects of metacommunication.

We expected greater knowledge to be demonstrated by older as compared to younger and by normal as compared to LD children.

Method

Subjects

Forty-five boys (24 LD and 21 normal children) from public elementary schools served as subjects. The LD subjects were the 12 oldest and 12 youngest male students in 4 special classes conducted under the auspices of the University of Virginia Learning Disabilities Research Institute (LDRI). The normal children attended the same schools as the LD children and were matched on age and IQ.

From the population of children in two local school districts who had been labelled LD, children were selected for the LDRI classes using several criteria. First, children were nominated by resource teachers as showing attentional problems (i.e., consistently engaged in off-task behavior); over half of the LD children in this population were so designated. Those nominees who were achieving at more than 90% of their IQ-predicted aptitude in reading or mathematics, those manifesting severe behavioral disturbances, and those who did not receive parental permission were excluded. The remaining sample constituted the LDRI classes. There were too few girls in the classes to allow systematic inclusion of subjects' sex as a variable, so the present sample was limited to boys.

The younger group of LD subjects (n=12) had a mean age of 7 years 10 months (SD=5 months) and a mean IQ of 109.4 (SD=14.4). The younger group of normal subjects (n=11) had a mean age of 7 years 9 months (SD=5 months) and a mean IQ of 109.2 (SD=15.8). The older group of LD subjects (n=12) had a mean age of 10 years 4 months (SD=6 months) and a mean IQ of 98.2 (SD=13.5). The older group of normal subjects (n=10) had a mean age of 10 years 3 months (SD=8 months) and a mean IQ of 96.5 (SD=15.3). IQ's were calculated from the results of the Peabody Picture Vocabulary Test (Dunn, 1965) administered to each subject within a week of testing. It should be noted that age differences in IQ were imposed by the scores of our LD sample,

and that they worked against the predicted age effects.

Materials

Four posterboard cards, with line drawings of boys' faces depicting 4 different emotions, were the only materials. The emotions (one depicted on each 17 x 23 cm card) were: happy, sad, angry, and confused. The drawings were pilot tested on a group of 20 college students who were asked to identify the boy who "looked as if he didn't understand how to play a game." All 20 chose the card depicting the confused child.

Procedure

Each subject was interviewed individually by an adult female in a quiet room in his school. The interviewer seated each boy next to her at a small table and explained that she was interested in knowing how he would teach a new game to a friend. She asked him to pretend that he had a new game involving 2 players, that a friend had come over to his house to play, and that the friend didn't know how to play the game. She then asked the subject a series of questions about how he would teach his friend the game.

The questions in the interview were:

1. If you want to play the game with your friend, what would you do next?
2. How would you know if he understood how to play?
3. What are some ways you would know if he didn't understand how to play?
4. Could you tell if he didn't understand from the way his hair is combed?
5. Could you tell if he didn't understand from the look on his face?
6. (Interviewer sets out the 4 line drawings of boys' faces) If your friend didn't understand how to play the game, which one of these kids would he look like?
7. If your friend didn't understand the game, do you think he would play the game right or wrong?
8. What could your friend do to play the game better?

9. Could he say anything to you? (If yes) What could he say?
10. What could you do to help your friend understand the game better?
11. What could you do if your friend said, "Idon't know how to play"?
12. Would it help your friend to play better if you tell him all the rules again? How come?
13. Would it help your friend to play better if you tell him not to play any more? How come?
14. Would it help your friend to play better if you ask him what parts he didn't understand, and then explain those parts over again? How come?
15. Which one do you think would help more: if you tell your friend all the rules again or if you ask him what parts he didn't understand, and then explain those parts over again? How come? (This item was repeated slowly, with gestures to emphasize the 2 options).

The interviewer asked the questions in the same order for each boy, and she always encouraged each child to elaborate on his answers as much as possible. The order in which the items appeared was designed to create a plausible conversational progression. Questions 2 through 7 dealt with the child's knowledge about cue sensitivity: to what extent was the subject aware of the listener cues which indicate the need to employ communicative strategies? Questions 1 and 8 through 15 were designed to elicit knowledge about strategy use: to what extent was the subject aware of various communicative strategies and their probable effectiveness?

After completing the interview, the interviewer thanked the subject for participating and escorted him back to his classroom.

Coding of Responses

Audiotape records of each interview were transcribed verbatim for coding. Scoring of the yes-no questions (4, 5, and 7) simply involved assigning a 1 to correct responses and a zero to incorrect responses. For the picture choice (Question 6), a 1 was assigned if the child picked the confused face and a zero if

he chose any of the other three. These items were scored from the transcripts and verified against notes made by the interviewer.

Responses to the open-ended items were scored on a scale of 0 to 3 by each of two independent coders. For all these items, a score of zero was assigned when a child said he did not know or gave no answer. Only 4% of the responses were coded as zeros, and these occurred about equally across the 4 groups of subjects. A score of 1 was given to inadequate answers---i.e., responses which, if translated into action, would not offer a basis for successful communication. Responses scored "1" were exceedingly context-bound, uninformative, or did not admit the possibility of listener noncomprehension. Nonetheless, a score of "1" could be differentiated from a zero, in that a "1" involved an attempt, albeit of limited usefulness, to generate some solution to the communication problem. The child who generated an inadequate solution would still be filling his turn in communication with his friend, thus sustaining the interaction and offering a greater possibility of gradually resolving the comprehension problem than the child who could generate no solution at all. A score of "2" was assigned to responses which dealt with the questions adequately, but which did not take verbal or nonverbal (e.g., facial expression) feedback from the other person into account. A child who followed his own advice at the "2" level could function as a teacher but would not be alert to conversational cues and strategies that could be used to check listener comprehension, to signal noncomprehension, or to obtain or offer further clarification. A score of "3" was assigned to responses that were not only correct, but also showed awareness of such aids to communication. For items involving a "yes-no" response followed by a justification, the coding system incorporated both answers in a single rating of response content.

Some examples may help to clarify the substance of these distinctions. On item 1, a score of 1 was given for responses such as, "say to him, 'go this way'." A score of 2 was given for, "teach him the rules" (see preceding paragraph). A

score of 3 was given for, "tell him the rules and ask if he knows how yet." On item 2, a score of 1 was given for, "cause I teached it to him," A score of 2 was given for, "he'd play right." A score of 3 was given for, "I'd ask him if he understood. " On item 8, a score of 1 was given for,"know how to play." A score of 2 was given for, "watch how the other person does it." A score of 3 was given for, "ask the person that knows how to play it."

Average agreement between the two coders was 95% (24 disagreements in 495 open-ended responses coded). Agreement was 99% for the cue-sensitivity items and 94% for the strategy-use items. Disagreements were resolved by discussion between the coders.

Results

Our main interest was in children's overall knowledge with respect to our pre-established categories of questions, rather than their specific performances on any individual item. We therefore added together each child's scores for the interview questions to form non-overlapping subtotals representing the cue-sensitivity and strategy-use variables. The resulting mean scores and standard deviations are shown in Table 1.

Insert Table 1 About Here

As an initial step, we conducted a 2 (younger vs. older) x 2 (LD vs. normal) multivariate analysis of variance, using scores for the cue-sensitivity and strategy-use scales as the dependent variables. Consistent with our expectations, this analysis revealed overall multivariate effects of age, $F(2,40)=4.81$, $p<.02$, and diagnostic condition, $F(2,40)=6.55$, $p<.005$, on the interview scores. The interaction was not significant.

To explore the main effects, we conducted subsequent univariate analyses. These tests revealed that older children gave better answers than younger ones both for

cue-sensitivity items, $F(1,41)=4.17$, $p<.05$, and for strategy-use items, $F(1,41)=8.70$, $p<.01$. In addition, normal children gave more adequate answers than LD children for strategy-use, $F(1,41)=12.85$, $p<.001$, but not for cue-sensitivity items.

Although the interaction of age and diagnostic condition was not significant, further exploration of the main effects was nevertheless of interest. For this reason, we conducted four post-hoc individual comparisons, using the Bonferroni method of correcting for the experimentwise error rate. Results showed an increase with age in knowledge about strategies among normal children, $t(19)=3.31$, $p<.02$, but not among LD children, $t(22)=1.70$, n.s. In addition, while younger LD and normal children did not differ significantly on this variable, $t(21)=1.54$, n.s., older normal children gave more adequate answers than older LD children, $t(20)=3.42$, $p<.01$. Thus, these analyses suggest that the increase with age in knowledge about strategy use shown by normal children was not matched by the LD children.

Overall performance on the sensitivity items was quite high (see Table 1), and--although in the expected direction--individual comparisons for the effect of age within diagnostic conditions were not significant.

A potential difficulty of interpretation is raised by the fact that while some cue-sensitivity items were forced-choice and some were open-ended, all of the strategy-use items were open-ended. Thus, it is possible that the absence of LD-normal differences on cue-sensitivity items could be attributed primarily to this variation in response format rather than to the substance of the items. To check on this possibility, we calculated "cue-sensitivity subscores" using only responses to open-ended cue-sensitivity questions. Contrary to expectations based on a response format interpretation, the pattern of means for this subscale was very similar to that obtained for the entire set of cue-sensitivity items. The means were: younger LD--4.3, older LD--5.2, younger normal--4.8, and older normal--5.4 (maximum possible score=6). Even on this reduced subscale, the effect of age approached significance,

$F(1,41)=3.48$, $p<.07$. More important for our present concerns, however. the effect of diagnostic condition did not approach significance, $F<1$. It is therefore unlikely that variations in response format alone can account for our findings that LD children differed from normal children on strategy-use but not cue-sensitivity aspects of metacommunicative knowledge.

A more qualitative approach to the data gives insight into the levels of performance we observed. To perform this analysis, individual children's mean scores on open-ended items of each scale were computed. This yielded an average which could range from zero to three for each scale. The average score could be interpreted according to the coding system described above. For the purpose of classifying scores (Table 2), we counted mean scores falling in the range of 1.67-2.33, inclusive, as reflecting a "2" performance; i.e., adequate but not interpersonally responsive. Scores below this range were considered reflective of generally inadequate knowledge; scores above this range were considered reflective of some consistent awareness of the need to take the communication partner into account.

As shown in Table 2, and as was found in the analysis of variance, scores on cue sensitivity were generally high, with at least half of each group acknowledging the role of feedback from the communicative partner. Inadequate responses were almost completely limited to younger children (7 younger versus 1 older child). Scores on strategy use reflect more dramatic differences among groups. No younger LD subject scored in the highest ("feedback") category; no older normal subject scored in the lowest ("inadequate") category. The distribution of performances of the older LD group and younger normal group appear very similar to each other. Interestingly, it is only within the older normal group that more than half the children consistently demonstrated knowledge of interpersonal aids to communication.

Although our main interest was in overall patterns of responses rather than in

performance on individual questions, the relationships among responses to individual items within and between cue-sensitivity and strategy-use scales were of some interest. The average correlation of individual items on the cue-sensitivity scale with the total score for this scale was .53; for the strategy-use scale, the average correlation of its individual items with the total scale score was .56. We also computed correlations between individual item scores and total scores for the scales to which they did not belong. Cue-sensitivity items' average correlation with the strategy-use total score was .21, and strategy-use items' correlation with the cue-sensitivity total score was .22. Thus, the various items comprising each scale correlated more highly with the total for their own scale than with that of the other scale.

Discussion

Overall, children's knowledge about communication-relevant variables increased with age, both for cue-sensitivity and for strategy-use items. Older children were more aware of conditions that might signal communication breakdowns, and they also knew more about strategies that might be employed to overcome initial communication failures. These results are consistent with earlier findings on deficiencies in communicative performances among younger children (Glucksberg et al., 1975; Patterson & Kister, 1980) and suggest the possibility that younger children's lack of relevant metacommunicative knowledge may contribute to such deficiencies.

At a descriptive level, our results provide a sense that considerable growth takes place in both sensitivity and strategy-use aspects of metacommunication during middle childhood. Seven year olds seldom proposed more than one communicative strategy (e.g., "tell the rules"), even when questioned repeatedly. Normal ten year olds, however, frequently offered multiple suggestions. When asked how he would know whether his friend knew how to play the game (question 2), for instance, one older normal boy said, "Well, first I'd ask him. Then I'd let him go first. If he does the right thing I told him to, I'd be sure he knows how to play." In response to question 3

("what are some ways you would know if he didn't understand how to play?"), the same boy also showed his understanding of more subtle and complex aspects of interpersonal communication: "He might ask me, or just keep silent and try to hide it and pretend he knew how to play...and then mess up." Responses of this kind, emphasizing an evaluation of the congruence between word and action, were given by a number of the normal ten year olds.

It might be argued that LD children's answers to interview questions were not good indices of their actual metacommunicative knowledge. For example, might not the adequacy of LD children's answers have been limited by their deficiencies in oral expression? This is unlikely, because answers were scored on their content rather than their grammatical style and because even answers receiving the highest scores required no more complex or difficult linguistic constructions than those given lower scores. Further, even after eliminating variations in response format, differences between LD and normal children occurred on strategy-use but not on cue-sensitivity items; this finding would not be predicted from assumptions about general communication deficits among LD children. Simple response biases can also be ruled out on the grounds that both positive and negative answers were required on forced-choice items, and that justifications were required both for forced-choice and open-ended questions. Overall, it appears unlikely that such potential artifacts could account for the findings we report.

The results also showed that LD children evidenced significantly less knowledge about communication-relevent variables than did normal children matched on age and IQ. These deficits stemmed from LD children's relative lack of knowledge about appropriate communication strategies rather than from insensitivity to signs of comprehension difficulty, and they appeared to become more pronounced with age. The fact that LD children--with their well-documented deficits in oral communication skills--were also deficient in the strategy-use aspects of metacommunication is consistent with the idea that considerable metacommunicative knowledge is required

for mature communicative performance (Flavell, Note 1, Note 2; Torgesen, 1977).

In addition, our findings accord well with reports of the relationship between interpersonal problem-solving strategies and indices of social adjustment (e.g., Spivack, Platt, and Shure, 1976). Learning disabled children, who appear to be less socially competent than their peers, especially in verbal interaction skills (Bryan, 1978), may in fact know less about interactional communication strategies that could help them. This latter point may also be true of younger normal children. The present study was focussed on strategies for peer teaching and learning; future work could explore other aspects of interpersonal communication skills, such as strategies for persuading or appeasing another person. Further research is also needed to assess the relationship between metacommunication knowledge and communicative performance, particularly in the domains of strategic and interpersonal skills.

Finally, we return to Torgesen's suggestion that the LD child's difficulties in many task settings "may be due to the child's failure to actively engage the task through the use of efficient strategies" (Torgesen, 1977, page 39). Whether this remark is applied to the LD child or to the younger normal child, our current findings suggest that any such "passivity" in communication tasks could result from the child's lack of knowledge about strategy use in communication.

Reference Notes

Note 1. Flavell, J. H. The development of metacommunication. Paper presented at the Symposium on Language and Cognition, Twenty-first International Congress of Psychology, Paris, July 1976.

Note 2. Flavell, J. H. Metacognitive development. Paper presented at the NATO Advanced Study Institute on Structural/Process Theories of Complex Human Behavior, Banff, Alberta, Canada, 1977.

Note 3. Pearl, R. A., Donahue, M. L., & Bryan, T. H. Learning disabled and normal children's responses to requests for clarification which vary in explicitness. Paper presented at the Boston University Conference on Language Development, Boston, September 1979.

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Footnote

[1]The two categories of metacommunication studied here resemble the "strategy" and "sensitivity" variables suggested by Flavell (Note 1). Our strategy-use category parallels Flavell's ("learnable communication strategies," p. 6). However, our cue-sensitivity category encompasses both the "deliberate, active...means-to-end" qualities of Flavell's "sensitivity" aspect (p. 3) and the "active monitoring and evaluation of messages and their effects, both by sender and by receiver" (p. 4) of Flavell's "person" aspect.

Table 1

Mean Scores for Cue Sensitivity and Strategy Use

as a Function of Age and Condition

Diagnostic Condition	Age	N	Item Categories: Cue Sensitivity[a] M	Cue Sensitivity[a] SD	Strategy Use[b] M	Strategy Use[b] SD	Total M	Total SD
LD	Younger	12	7.3	2.1	14.8	2.7	22.1	4.2
	Older	12	8.5	1.4	16.3	4.6	24.8	4.9
Normal	Younger	11	7.7	1.9	17.0	4.0	24.7	5.3
	Older	10	8.6	1.3	21.7	2.1	30.3	2.5

[a] maximum possible score = 10

[b] maximum possible score = 27

Table 2

Distribution of Individual Mean Scores for Open-Ended Cue Sensitivity and Strategy Use Scales (Expressed as Percent of N)

Diagnostic Condition	Age	N	Item Categories: Cue Sensitivity <1.67	Cue Sensitivity 1.67-2.33	Cue Sensitivity >2.33	Strategy Use <1.67	Strategy Use 1.67-2.33	Strategy Use >2.33
LD	Younger	12	33	17	50	50	50	0
	Older	12	8	25	67	25	67	8
Normal	Younger	11	27	9	64	27	64	9
	Older	10	0	20	80	0	40	60